	Building Information	
Information Type	Existing	Proposed
Building Size / Stories	1975 Sq. Ft. / 1 Story	1975 Sq. Ft. / 1 Story
Lot Size	5042 Sq. Ft. (0.116 Acre)	5042 Sq. Ft.
Lot Coverage	39%	39%
Building Height	14 Feet	14 Feet
Number of Units/Bedrooms per Unit	2 Units / 2 Bedrooms	3 Units / I Bedroom
Number of Buildings	1 Building	1 Building
Impervious Area	2028 Sq. Ft.	2295 Sq. Ft.
Impervious Percentage	40%	45.5%
Zoning District	Community Business	Community Business
CAMA Land Use Classification	Urban	Urban
Off Street Parking Required	2 Spaces	3 Spaces
Flood Zone	AE9999	AE
Water Consumption per Day	I 60 Gallons	240 Gallons
Sewer Usage per Day	I 60 Gallons	240 Gallons

# Landscaping Note:

There are presently no trees on the site.

# Setback Requirements:

Rear

Front 20 Feet

25 Feet (abutting Residential District)

Interior Side 5 Feet Corner Side 20 Feet

# General Notes:

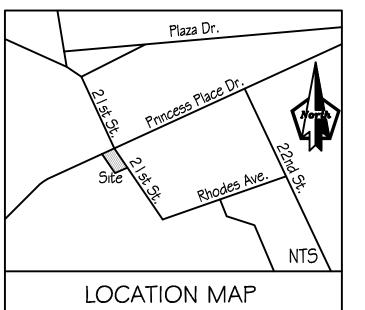
Building is existing and there are no plans to modify the footprint of the building.

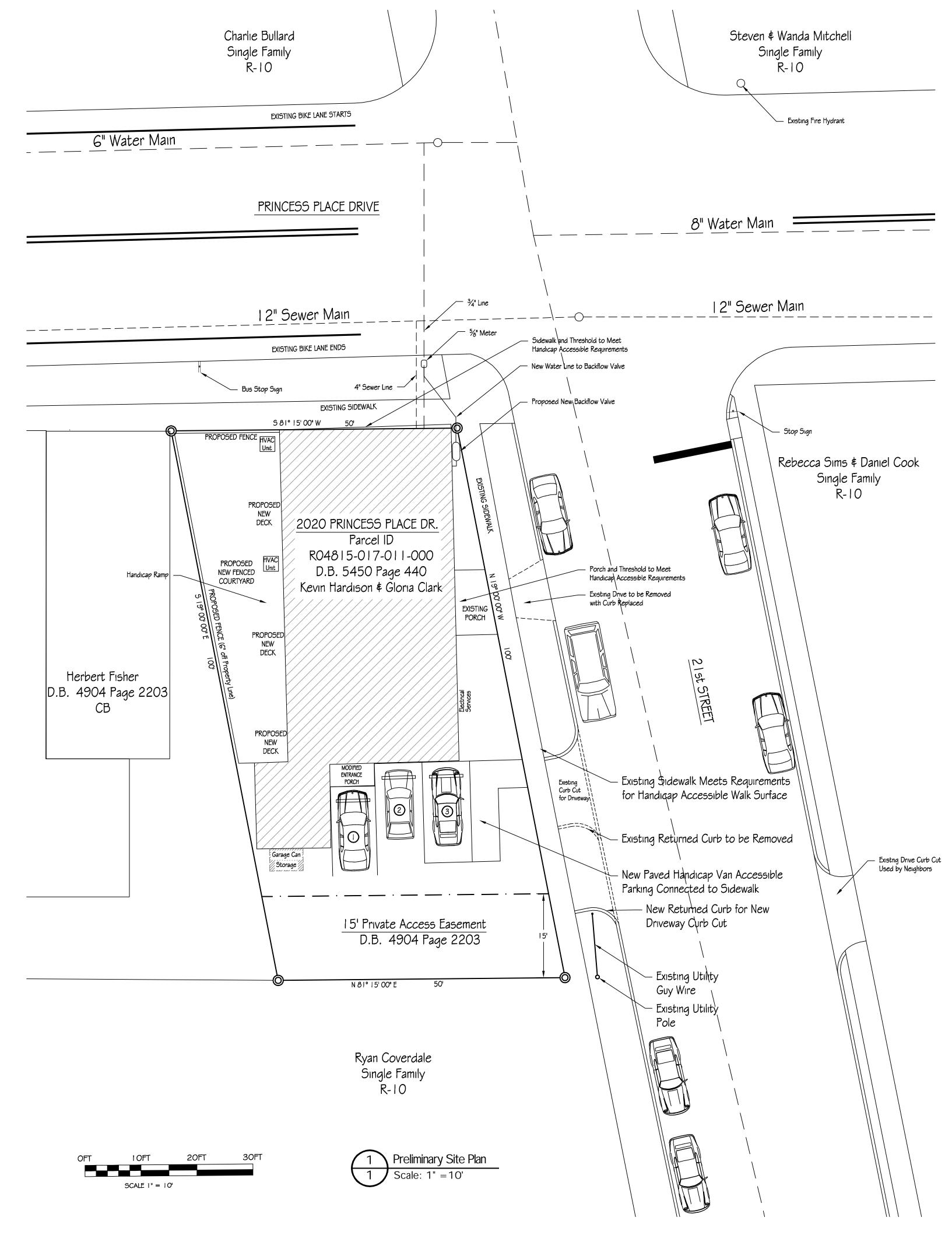
Substantially the entire site is in the AF flood zone on the current flood mans as well

Substantially the entire site is in the AE flood zone on the current flood maps as well as the preliminary flood maps.

Fencing materials to be determined. Recommendations would be appreciated.

Proposed parking stalls are  $8\frac{1}{2}$  wide X 18 long.





ROFESSIONAL ENGINEER
EASTWOOD RD, SUITE 4 TIM@TIMHINESPE.COM



HARDISON & CLARK RESIDENTIAL HOTE

SITE PLAN

DRAWN BY: APPROVED T.E.H.

Hardison & Clark Plans 5-4-2016 1.dwg

SHEET CV-1

OF

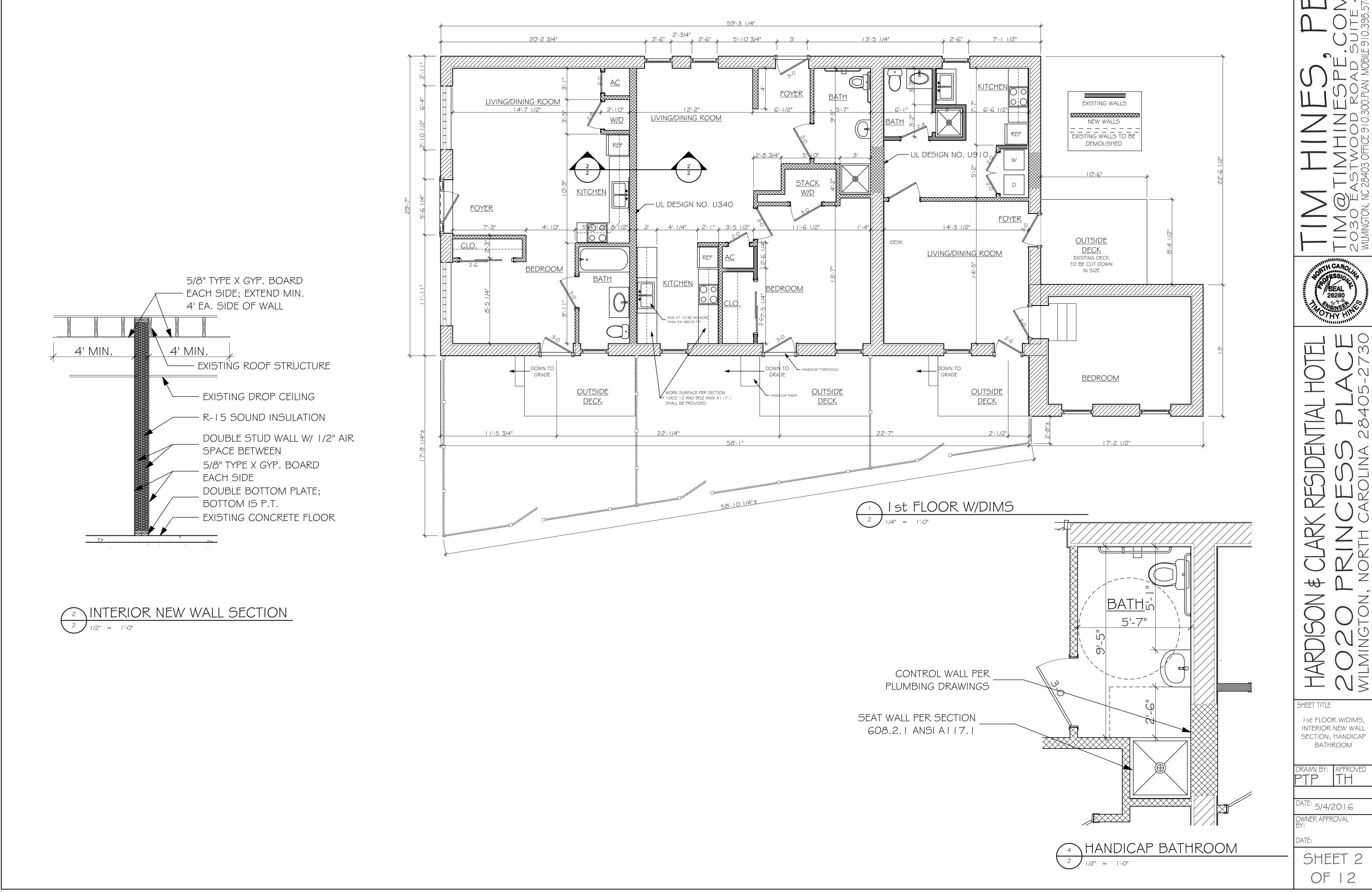
DATE: May 4, 2016

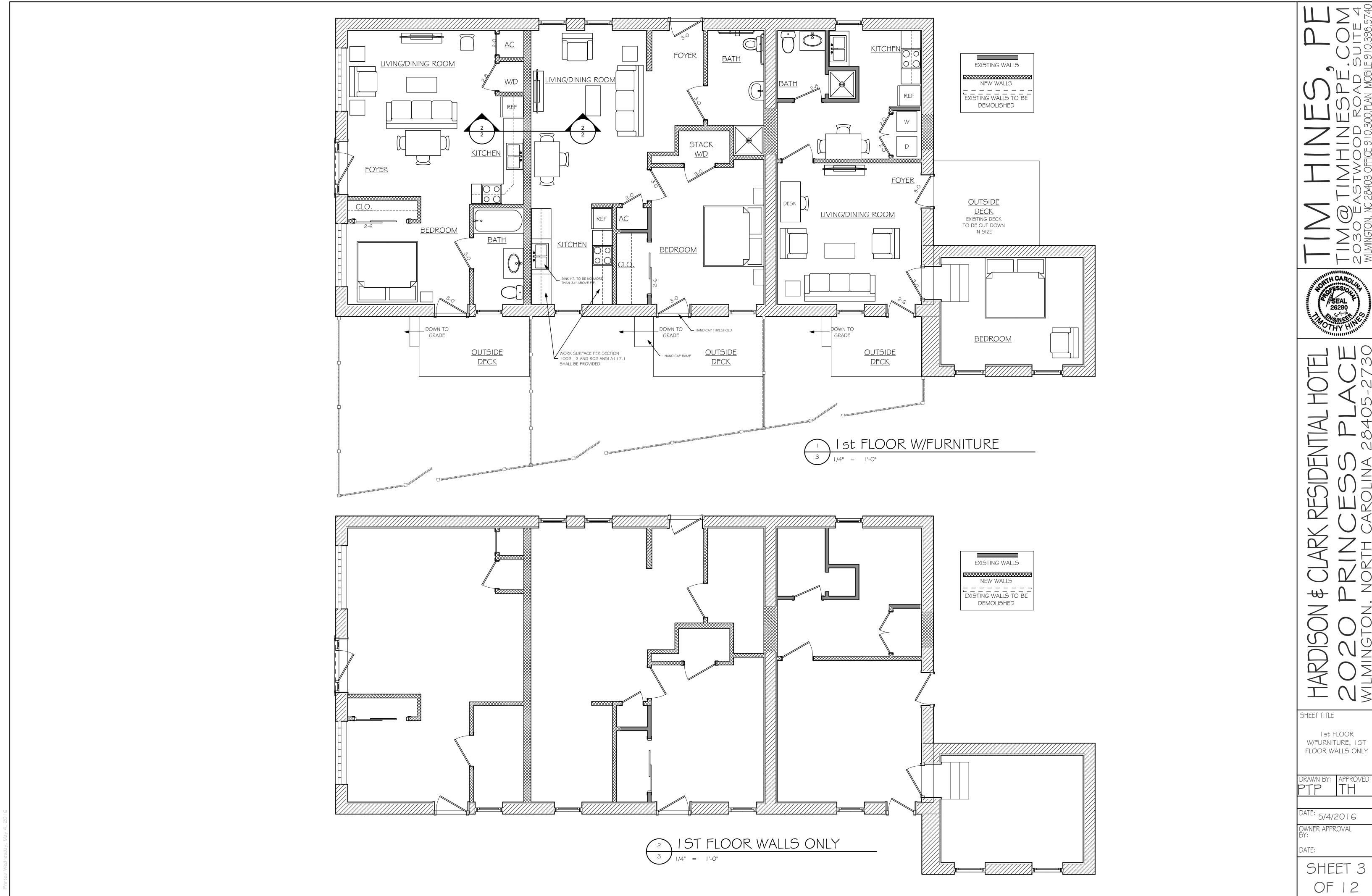


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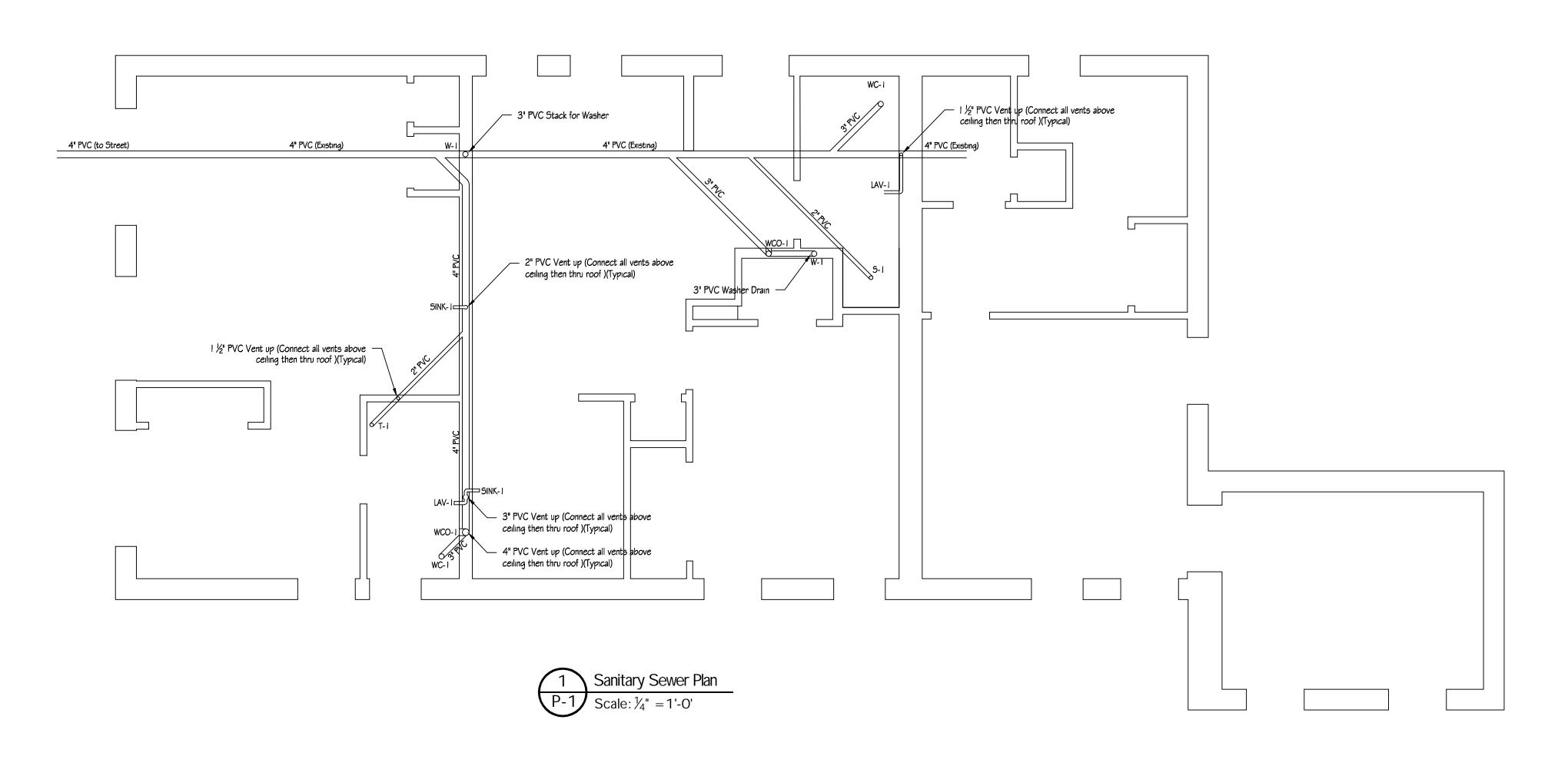
1st FLOOR AS BUILT, 1st FLOOR DEMO PLAN

DATE: 5/4/2016 OWNER APPROVAL









		5,	ANITARY PLUMBING FIXTURE SCHEDULE			
MARK	FIXTURE	MANUFACTURER MODEL	DESCRIPTION	SUPPLY CONNECTION HOT	SUPPLY CONNECTION COLD	WASTE CONNECTION
WC-I	WATER CLOSET	PROFLO PF I 40 I TWH	TOILET WITH SEAT (PF93   2WH) COLOR WHITE	N/A	1/4"	3"
LAV-1	LAVATORY	PROFLO PF5414WH	WALL HUNG ONE-PIECE LAVATORY, COLOR WHITE	1/4"	1/4"	1 ½"
LAV-1	LAVATORY FAUCET	PFISTER PG I 435000	4" CENTER BATHROOM LAVATORY FAUCET (CHROME)	1/4"	1/4"	1 ½"
SINK-I	KITCHEN SINK	PROFLO PFSR332264	STAINLESS STEEL DOUBLE BOWL KITCHEN SINK	1/4"	1/4"	1 ½"
SINK-1	KITCHEN FAUCET	AMERICAN STANDARD A4175700002	THREE HOLE, SINGLE HANDLE KITCHEN FAUCET, COLOR CHROME	Hose	Hose	3"
T-1	FIBERGLASS TUB	AMERICAN STANDARD A2390202011	STANDARD FIBERGLASS TUB WITH INTEGRAL SKIRT/APRON, COLOR WHITE	N/A	N/A	1 ½"
T-1	TUB/SHOWER MIXING VALVE	DELTA B 1 1 4 9 0 0 SERIES	TUB/SHOWER MIXING VALVE WITH SHOWER HEAD AND SPIGOT	1/2"	1/2"	N/A
5-1	SHOWER MIXING VALVE	DELTA B I I 2900 SERIES	TUB/SHOWER MIXING VALVE WITH SHOWER HEAD	1/2"	1/2"	N/A
W-1	WATER OUTLET BOX	OATEY 38528	QUARTER-TURN BALL VALVE PEX WASHING MACHINE OUTLET BOX	Hose	Ноѕе	3"
WH-I	WATER HEATER	WHIRLPOOL E2F40LD045V	38 GALLON LOWBOY ELECTRIC WATER HEATER	3/4"	3/4"	N/A
WH-I	WATER HTR DRAIN PAN	CAMCO 20854.0	28 INCH EMERGENCY WATER HEATER DRAIN PAN	N/A	N/A	}"

			WASTE			
MARK	FIXTURE/EQUIPMENT	WASTE F.U. PER FIXTURE	TOTAL WASTE F.I			
WC-I	WATER CLOSET	3.0	9.0			
LAV-1	LAVATORY	3	1.0	3.0		
SINK-I	KITCHEN SINK	3	2.0	6.0		
T-1	SHOWER/TUB	1	2.0	2.0		
5-1	SHOWER	2	2.0	4.0		
W-1	WASHER	3	2.0	6.0		
	TOTALS			30.0		

EXISTING SEWER LINE IN BUILDING IS 4" FIXTURE UNITS BASED ON 2012 N.C.PLUMBING CODE

# PLUMBING SPECIFICATIONS

- Contractor shall furnish all labor and materials required for a complete and operational system in accordance with all national, state and local codes and health regulations having jurisdiction. Contractor shall pay all fees and permits required.
- 2. Contractor shall guarantee installation against defects in workmanship, equipment and material furnished on project for a period of one year from date of final acceptance. provide extended guarantees for equipment such as water heaters when required.
- 3. Submit for approval the number of shop drawings and manufacturers literature on all plumbing fixtures and materials as required to the Architect or Owner's
- 4. Contractor shall visit the job site and examine premises at and adjacent to proposed work, verify existing pipe sizes, location and suitability for connection to the
- 5. Drawings are diagrammatic and intend to show approximate location of piping, fixtures, etc. Contractor shall review all architectural, civil, structural, electrical and mechanical drawings and coordinate with other trades for pipe routing and equipment placement. Install all work without conflict with other trades and make minor alterations as required without additional cost to Owner.
- 6. Contractor shall cooperate fully with Owner in scheduling and making connections to existing service lines so as to cause the least possible inconvenience and shortest possible interruption of service.
- 7. Contractor shall coordinate with Electrical Contractor all voltages, electrical loads, etc., of electrically operated equipment prior to purchasing equipment. All equipment shall be UL and NEMA approved.
- 8. Maintain a minimum clearance of 3'-0" in front of all electrical panels and 1'-0" either side of panel to structure. all piping shall be routed around this area.
- 9. Contractor shall furnish access panels, to be installed by the general contractor, as required for plumbing installations.
- 10. All sanitary vent roof penetrations shall be a minimum distance of 10'-0" away from all rooftop mechanical equipment or other air intake devices.
- II. All horizontal and vertical piping shall be supported in accordance with state and local requirements. Supports shall securely hold piping, prevent vibration, compensate for static and operational conditions of the various systems, and shall not be subject to electrolytic action.
- 12. Contractor to coordinate and install, if required for this project, new water meter as per requirements of local utility company. Contractor shall include all tap fees and costs into bid for a complete installation.
- 13. Domestic water piping outside of the building is existing. The new water lines to existing.
- 14. All domestic hot water and cold water piping shall be PEX with standard compression fittings. Piping passing under and through concrete slab or walls shall be protected with a protective sheeting or wrapping to prevent damage to the piping.
- 15. Valves serving domestic water systems shall be ball valves or approved equal. All valves shall be located so as to be accessible by maintenance personnel.
- 16. All water piping shown routed in exterior walls shall be located inside the building insulation and finished wall to prevent freeze damage.
- 17. Contractor shall field verify the location and invert at the point of connection to the sewer system before determining final routing of soil, waste and vent piping.
- 18. All soil, waste and vent piping shall be schedule 40 PVC plastic pipe where allowed by local authority having jurisdiction for this installation. Provide 3m fire barrier caulk CP-25 caulking, or u.l. approved equal, at any penetration of fire rated assemblies.
- 19. All soil, waste and vent piping shall be uniformly graded and shall have a slope of not less than 1/4" per foot for piping 3" in diameter and smaller and 1/8" per foot for pipe larger than 4" in diameter.



SANITARY

SHEET TITLE SEWER

Hardison & Clark Plans 5-4-2016 2.dwa

PLAN

DATE: May 4, 2016 OWNER APPROVAL

		5.	ANITARY PLUMBING FIXTURE SCHEDULE			
MARK	FIXTURE	MANUFACTURER MODEL	DESCRIPTION	SUPPLY CONNECTION HOT	SUPPLY CONNECTION COLD	WASTE CONNECTION
WC-I	WATER CLOSET	PROFLO PF I 40 I TWH	TOILET WITH SEAT (PF93   2WH) COLOR WHITE	N/A	1/4"	3"
LAV-1	LAVATORY	PROFLO PF5414WH	WALL HUNG ONE-PIECE LAVATORY, COLOR WHITE	1/4"	1/4"	1 ½"
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T-1	FIBERGLASS TUB	AMERICAN STANDARD A2390202011	STANDARD FIBERGLASS TUB WITH INTEGRAL SKIRT/APRON, COLOR WHITE	N/A	N/A	1 ½"
T-1	TUB/SHOWER MIXING VALVE		TUB/SHOWER MIXING VALVE WITH SHOWER HEAD AND SPIGOT	1/2"	1/2"	N/A
5-1	SHOWER MIXING VALVE	DELTA B I I 2900 SERIES	TUB/SHOWER MIXING VALVE WITH SHOWER HEAD	1/2"	1/2"	N/A
W-1	WATER OUTLET BOX	OATEY 38528	QUARTER-TURN BALL VALVE PEX WASHING MACHINE OUTLET BOX	Hose	Hose	3"
WH-I	WATER HEATER	WHIRLPOOL E2F40LD045V	38 GALLON LOWBOY ELECTRIC WATER HEATER	3/"	3/4"	N/A
WH-I	WATER HTR DRAIN PAN	CAMCO 20854.0	28 INCH EMERGENCY WATER HEATER DRAIN PAN	N/A	N/A	1"

# PLUMBING SPECIFICATIONS

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- 2. Contractor shall guarantee installation against defects in workmanship, equipment and material furnished on project for a period of one year from date of final acceptance. provide extended guarantees for equipment such as water heaters when required.
- 3. Submit for approval the number of shop drawings and manufacturers literature on all plumbing fixtures and materials as required to the Architect or Owner's
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- 6. Contractor shall cooperate fully with Owner in scheduling and making connections to existing service lines so as to cause the least possible inconvenience and shortest possible interruption of service.
- 7. Contractor shall coordinate with Electrical Contractor all voltages, electrical loads, etc., of electrically operated equipment prior to purchasing equipment. All equipment shall be UL and NEMA approved.
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- 18. All soil, waste and vent piping shall be schedule 40 PVC plastic pipe where allowed by local authority having jurisdiction for this installation. Provide 3m fire barrier caulk CP-25 caulking, or u.l. approved equal, at any penetration of fire rated assemblies.
- 19. All soil, waste and vent piping shall be uniformly graded and shall have a slope of not less than 1/4" per foot for piping 3" in diameter and smaller and 1/8" per foot for pipe larger than 4" in diameter.
- 20. All soil and supply pipes penetrating fire walls will need firestop pipe collars properly sized and installed to protect the integrity of the firewall.



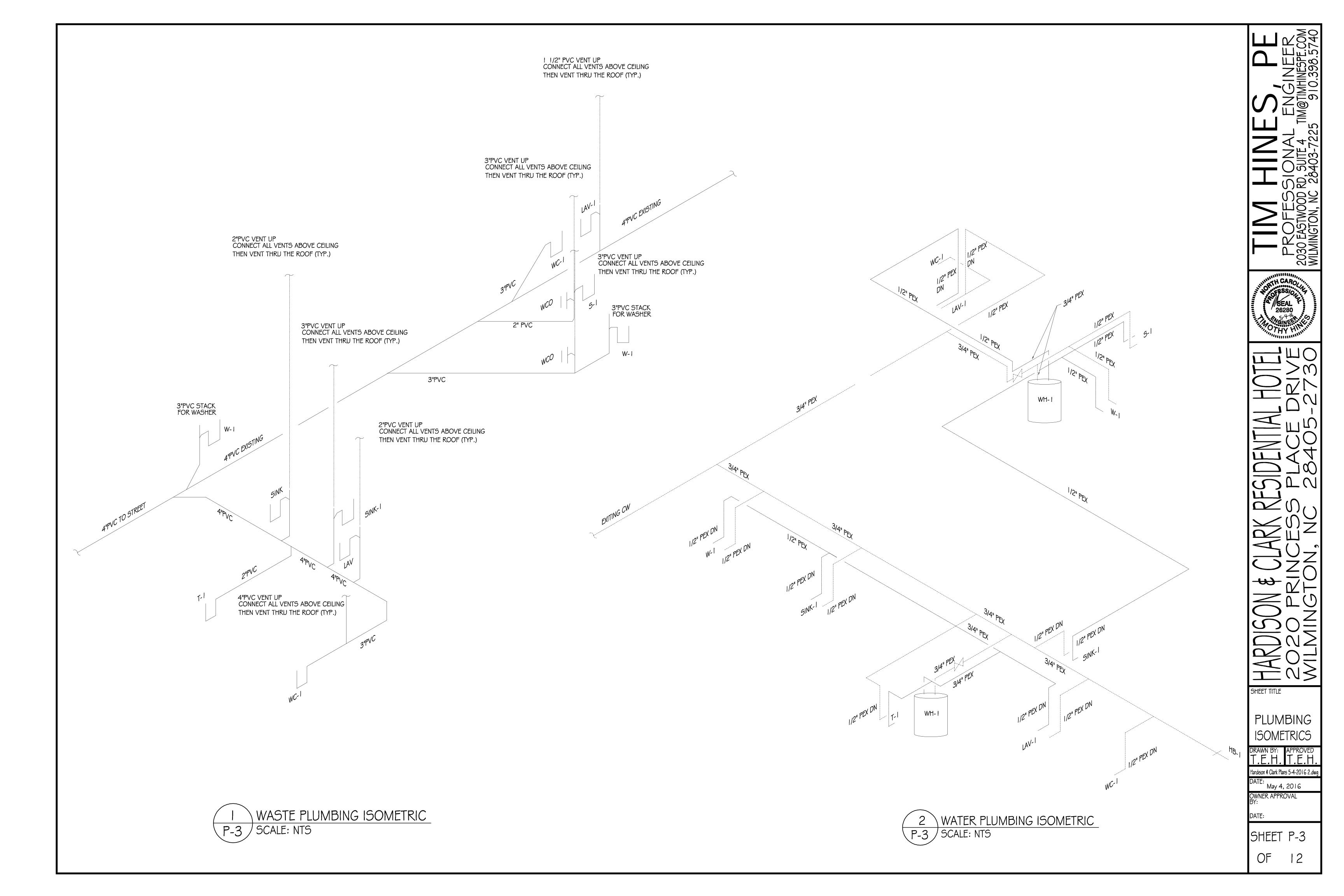
WATER

SHEET TITLE DISTRIBUTION

Hardison & Clark Plans 5-4-2016 1.dwg

PLAN

May 4, 2016



## Mechanical Specifications

#### PART I - GENERAL

- 1.1 Scope Of Work: These drawings and specifications describe the scope of work required for project mechanical heating, ventilating and air conditioning systems. contractor shall provide all labor and material required for a complete, fully functioning mechanical systems complying with the intent of the drawings and specifications.
- 1.2 Contractor: The word "Contractor" as used herein shall mean the HVAC installer unless otherwise qualified.
- 1.3 Drawings: Drawings are diagrammatic and may not completely describe every detail of the installation. however, Contractor is responsible for furnishing complete systems including all required equipment and accessories to obtain fully functioning HVAC systems.
- 1.4 Code Compliance: Comply with the latest editions of the following standards and codes, insofar as they apply:
- North Carolina State Building Code (Code), Latest Edition and Revisions. Local Jurisdiction Requirements.
- 1.5 Permits and Inspections Obtain all permits, licenses, inspections, etc., required for the work and pay for same. Furnish a final certificate of inspection and approval from the authority having jurisdiction prior to acceptance of the work.
- I.6 Workmanship: Utilize skilled mechanics to obtain a high quality professional finish installation when completed. Work of unacceptable quality shall be removed and reworked at no additional cost. Engineer shall be the judge of workmanship and their opinion will be final. In addition, any existing construction damaged by the Contractor shall be repaired or replaced to the satisfaction of the Engineer by the Contractor at no additional cost.
- 1.7 Supervision: Provide skilled superintendents to supervise the work from the beginning to completion and final inspection.
- 1.8 Progress of work: perform work in accordance with schedule and requirements of the owner, under no circumstances shall this contractor delay the overall project schedule.
- 1.9 Coordination: Coordinate mechanical work with the work of other trades. locations shown on the drawings are approximate unless specifically dimensioned. Layout mechanical work so as not to interfere with the work of other trades. Verify actual building structure prior to duct fabrication and adjust arrangement as required. Include all offsets in duct, fittings, piping, etc. as required to properly install equipment.
- 1.10 Equipment Locations: Determine exact equipment and materials locations to provide best arrangement and to facilitate proper maintenance and servicing of equipment.
- 1.11 Listing and Labeling: All equipment shall be labeled or listed by UL or other approved testing agency where required.
- 1.12 Storage Space: Consult with the Owner regarding job site storage for mechanical materials to be installed under this project. Storage space must be secured and Contractor's representative must be on job before any material may be received.
- 1.13 Cleanup: Remove all debris generated in the accomplishment of work under this project. clean, replace or repair all surfaces soiled or damaged during the course of the work. remove debris daily so to maintain safe working conditions.

#### 1.14 Electrical Work:

- A. Perform electrical work for mechanical equipment in compliance with project electrical requirements, electrical work for mechanical equipment not specifically indicated to be provided by the Electrical Contractor in the electrical drawings and specifications for this project shall be furnished by the mechanical contractor as part of his work.
- B. Electrical drawings are based on electrical characteristics indicated in drawing mechanical equipment schedules, any equipment furnished by the Mechanical Contractor which does not match the electrical characteristics indicated in the drawing schedules shall be coordinated with the Electrical Contractor. Any additional costs for electrical installation required for equipment not matching the drawing schedules shall be borne by the Mechanical Contractor.
- C. Low voltage control wiring for mechanical systems shall be furnished by the Mechanical Contractor

- A. Equipment submittals: submit four (4) copies of descriptive data for mechanical equipment and materials including grilles and dampers for approval by the Engineer. clearly identify all items.
- B. Operating and Maintenance Manuals: Submit two copies of complete operating and maintenance instructions for all equipment, including necessary cut sheets, charts, written instructions, wiring diagrams, final as-built drawings with balanced airflow indicated, etc. bind in suitable hard back ring binders, properly indexed, and deliver to the Owner prior to building occupancy. In addition, affix a folder with typical "Owner's Instructions" and "Maintenance" Information" inside the mechanical equipment as applicable. The folder shall also include a complete startup log for the equipment.
- 1.16 Record Drawings: Maintain one set of "red-lined" record drawings on site at all times and provide drawings to Engineer prior to final inspection.
- 1.17 Warranty Warranty the materials and workmanship covered by these drawings and specifications for a period of one year from the date of acceptance by the Owner. repair and/or replace any parts of any system that may prove to be defective at no additional cost to the Owner within the warranty period. Provide 5 year warranty for all air conditioning compressors. Furnish warranty certificates for all mechanical equipment. Warranty to commence upon date of acceptance of work by Owner.

## 1.18 Existing Buildings and Construction:

- A. Work under this contract is to be performed in an existing building, building layout indicated is developed from existing record documents and limited field verification for the purposes of describing the work. verify all existing conditions and adjust work as required to suit actual field conditions.
- B. Perform all work in accordance with government safety regulations.
- C. Do not cut any structural members without express written instructions from Engineer. Provide cutting and patching for existing finishes as required.
- D. Coordinate installation of new mechanical systems with existing building systems, adjust arrangements as required to accommodate interferences.

#### PART 2 - MATERIALS

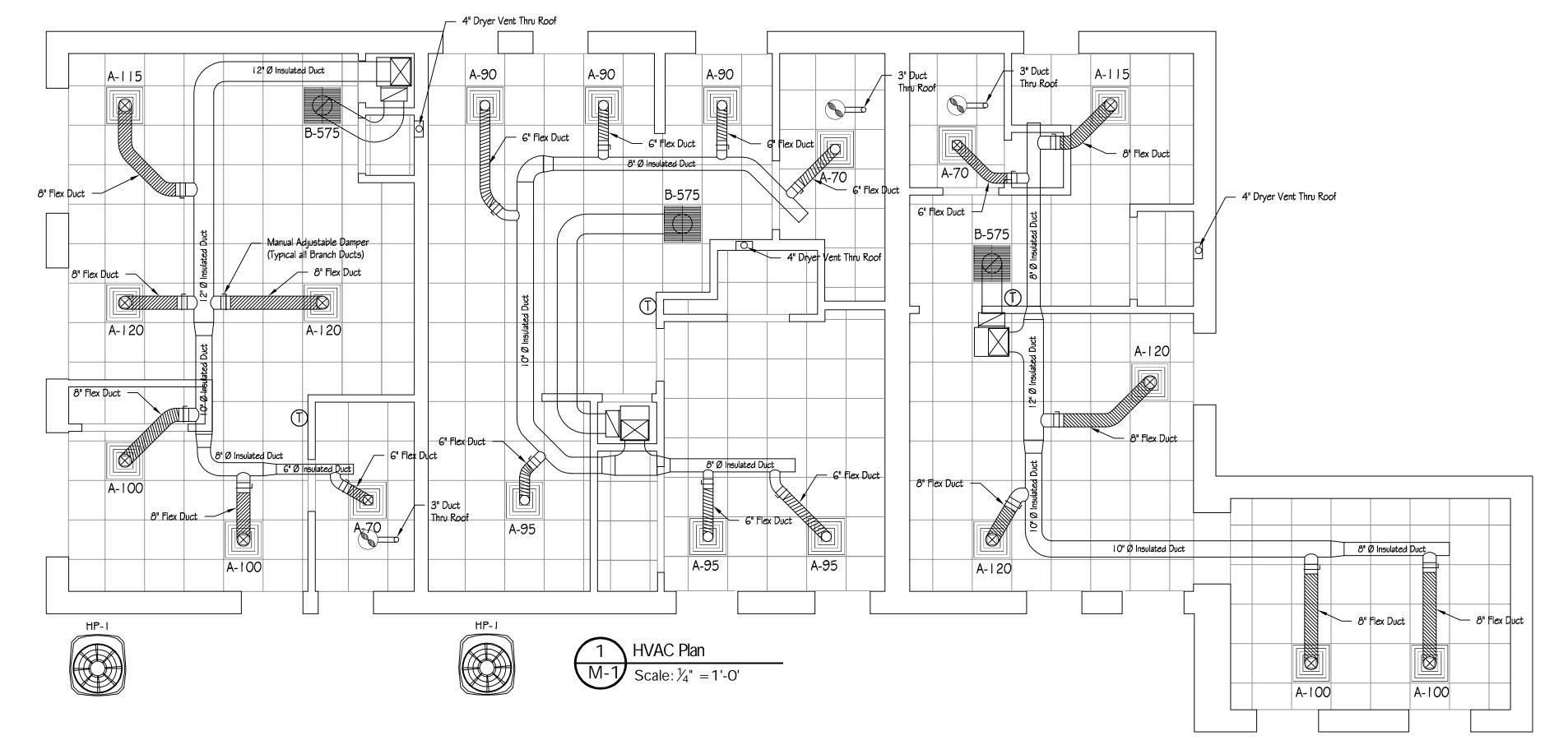
- 2.1 Equipment:
- A. Models as scheduled on the drawings. manufacturers indicated are intended to establish the quality and type of equipment desired. Comparable equipment will be considered for approval by the [Architect/]Engineer.
- B. Include all accessories indicated or as recommended by the manufacturer for proper operation.

#### 2.2 Air Distribution

- A. Diffusers and Registers models as scheduled on the drawings. manufacturers indicated are intended to establish the quality and type of equipment desired. Comparable equipment will be considered for approval by the Engineer. include finish and accessories as indicated
- B. Louvers models as scheduled on the drawings or equal.

#### 2.3 Refrigerant

- A. Refrigerant Piping: Type ACR copper with wrought copper fittings and brazed joints. size \$ install in strict accordance w/ refrigeration equipment
- B. Refrigerant Accessories: Provide for each refrigerant circuit-sight glass with moisture indicator, filter dryer, solenoid valve and expansion valve. gauges, charging valves, relief valves, low limit controls, and specialties required for a complete and installation. All accessories as recommended by the refrigeration equipment manufacturer. valves and specialties shall be made by Mueller, Henry, Alco, or equal.
- C. Condensate Piping: Sch 40 PVC w/ solvent weld joints. Provide trap at cooling coil drain connection. Provide cleanouts at change in direction. Extend condensate piping to approved discharge location.



#### 2.4 Insulation

- Refrigerant Piping Insulation: Elastomeric closed cell pipe insulation, Armaflex AP or equal, 3/4" thick. Protect all exterior, exposed pipe insulation with Armaflex WB finish.
- Condensate Drain Piping Insulation: Elastomeric closed cell pipe insulation, Armaflex AP or equal, 1/2" thick. Protect all exterior, exposed pipe insulation with Armaflex WB finish.
- All Supply Ducts are to be Insulated with R-8 Insulation Properly Installed so as to not be overly Compressed. Return Ducts are to be Insulated with R-4 Insulation. All Boots are to be Insulated by

#### 2.5 Controls

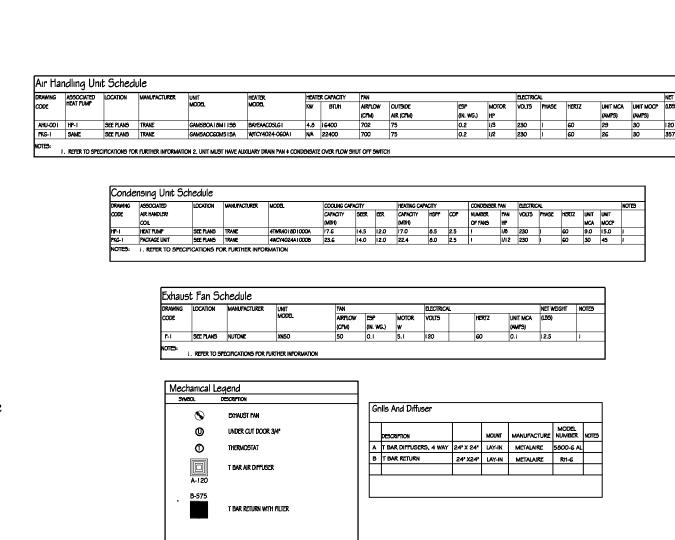
A. Wall-mounted remote controller, manufacturer's standard.

#### 2.6 Supports

- A. Hangers, Supports, and Anchors: Support and fasten all ductwork, piping, equipment, etc., securely in place using approved steel hangers and fasteners. chain, strap, perforated strap, wire hangers, or wood plugs are prohibited.
- B. Include steel supports, anchors, frames, bracing, plates, bolts, nuts, washers, etc. incidental to installation of work.
- C. Provide auxiliary structural members where required between members of the structure.
- 2.7 Refrigerant: Furnish a full charge of refrigerant for each system and maintain the charge for a period of one year from date of acceptance and replace any that may be lost (unless loss is determined to be caused by the Owner).

#### PART 3 EXECUTION

- 3.1 Preparation: Review construction documents and verify arrangement with field conditions. Coordinate proposed mechanical equipment and systems with associated work of other trades
- 3.2 Installation: Install all mechanical work in accordance with code, manufacturer's recommendations and good industry practice. arrange work to allow easy access to equipment for service and
- 3.3 Piping: Route piping neatly, parallel to building walls. where required, slope piping for proper drainage.
- 3.4 Piping Insulation: Install insulation neatly. Apply adhesive to both faces of joint to obtain fully adhered, vapor tight installation. finish all insulation exposed to weather with manufacture approved weatherproof coating.
- 3.5 Controls: Install and wire all controls complete to obtain intended sequence of operation.
- 3.6 Hangers and Supports: Hang and support equipment, duct and piping in a substantial manner from the building structure. Space hangers in accordance with code and so as to avoid excess deflection or sag. Provide seismic design hangers where required. No portion of the structure shall be over stressed by the hanging operation or by the final supports. Attachments deemed inadequate by the Engineer shall be reworked as directed. provide vibration isolation for moving machinery.
- 3.7 Refrigerant Piping Tests: Place refrigerant piping under a test pressure of 200 psig using anhydrous carbon dioxide or nitrogen before dehydrating with a vacuum pump to a vacuum of 26 inches hg. maintain vacuum for a minimum of 24 hours. refrigeration compressor shall not be used for this purpose. After system is vacuum tested, charge with system refrigerant and leak test entire circuit with electronic tester. Pressure and vacuum tests shall be witnessed by the Engineer.
- 3.8 Labels: Label all equipment and devices with bakelite engraved plates screwed in place. "tapewriter" and adhesive labels are unacceptable.
- 3.9 Start-Up: Verify installation is complete and ready for start-up. Start-up all equipment in strict accordance with manufacturer's recommendations using factory certified mechanics. After start-up, verify and document that equipment is operating properly within manufacturer's specified tolerances.
- 3.10 Testing and Balancing: Balance air flows to obtain air quantities shown on drawings. Adjust dampers for all air outlets and record velometer readings which correspond to design flow rates at each outlet. Record design and final readings on approved forms. Submit two copies for review and approval by Engineer. Upon completion of all balancing and testing, schedule a time for Engineer to perform random checking of typical outlets. Contractor shall provide technicians and measuring devices for this testing.
- 3.11 Commissioning: Demonstrate and document operation of all mechanical systems installed under this contract in the presence of the Engineer. Include all tests, trial operations, etc. as required to prove that all systems are in complete serviceable condition and will function as intended. All costs of commissioning shall be borne by this Contractor.
- 3.12 Training: Train Owner personnel in the proper operation and maintenance of mechanical systems. Provide written documentation including names of owner personnel attending training.
- 3.13 Clean-Up: Clean all equipment and devices and install new filters in equipment immediately prior to Owner acceptance and occupancy.



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SHEET TITLE

**HVAC** PLAN

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May 4, 2016

- The National Electrical Code, 2011 Edition
- 2. The National Electrical Safety Code
- 3. Underwriter's Laboratories, Inc., Standards and Approved Listings
- 4. Electrical Testing Laboratories Standards
- 5. North Carolina State Building Code, latest edition and revisions
- 6. All local codes and ordinances
- 7. NFPA 72
- 8. ADA

B. The Contractor shall obtain all permits, licenses, inspections, etc., required for the work and shall pay for the same. The Contractor shall furnish a final certificate of inspection and approval from the authority having jurisdiction prior to acceptance of the work.

C. All work shall be done by skilled mechanics and shall present a neat, trim and workmanlike finish when completed.

#### 16.2 Coordination:

A. Do not scale electrical drawings. Locations shown are approximate. The Contractor shall visit the site 16.9 Trenching: for exact measurements in the placement of equipment, fixtures, outlets, etc. The drawings do not give exact details as to elevations and locations of various fittings, conduit, etc., and do not show all offsets and other installation details which may be required.

B. Work with other Contractors

16.3 The Electrical Contractor shall make final electrical connections for all HVAC equipment.

#### 16.4 Materials:

All materials shall be new and shall bare the manufacturer's name, trade name, and UL label where such a standard has been established for the particular material. Materials shall be the standard product W/R4 insulations of manufacturer's regularly engaged in the manufacture of the required type of equipment and the manufacturer's latest approved design.

## 16.5 Wiring Methods:

Match existing wiring methods. All work shall be in conduit.

#### 16.6 Boxes:

Junction, switch, receptacle and outlet boxes for interior use in dry locations shall be zinc coated or cadmium plated sheet steel, 4" square and 2-1/8" deep, unless otherwise indicated on the contract drawings. Exterior and exposed boxes shall be cast type with hubs. Smaller and shallower outlet boxes will be permitted only are easily recognizable in the on or off position. Fuse clips shall be designed to accommodate NEMA ful, class R schedule as agreed upon with the Owner. by special permission of the Engineer where such boxes are necessary due to structural conditions encountered. Where larger junction boxes are required, they shall be fabricated from no. 10, 12, 14 or 16 gauge sheet steel as 16.13 Enclosed Circuit Breakers: required by the Underwriter's Laboratories, Inc., and galvanized after fabrication. All junction boxes shall have screw fastened covers. Outlet boxes shall be provided with extension plaster rings where required by structural and finish conditions. Set wall mounted boxes at elevations to accommodate mounting heights indicated and specified in section for outlet device. Boxes are shown on drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet (3 m) if required to accommodate intended purpose. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Install boxes to preserve fire resistance rating of partitions and other elements, using approved materials and methods. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes. Use flush mounting the existing equipment to maintain equipment ratings. Accessories shall be provided as noted or required and outlet box in finished areas. Use stamped steel bridges to fasten flush mounting outlet box between studs. 16.7 Raceways and Fittings:

- A. Raceways shall be rigid galvanized steel, electrical metallic tubing and/or schedule 40 PVC with appropriate fittings. EMT fittings shall be hex nut steel compression type with insulated throats.
- fittings.
- C. Junction and outlet boxes for interior use in dry locations shall be zinc coated or cadmium plated sheet steel, 4" square by 2-1/8" deep, except single wiring device boxes may be single gang.
- D. Raceways, boxes, fittings, etc., shall be solidly fastened to masonry with lead anchors and machine screws or toggle bolts. Raceways shall be fastened to structural steel with beam clamps, conduit hangers, trapeze hangers, or other approved devices.
- E. Boxes installed in concealed locations shall be set flush with the finished surfaces and shall be provided requirements of these specifications. with extension rings [or plastic covers] where required. Boxes shall be rigidly installed.
- F. Raceways passing through rated walls, floors, etc., shall be installed in accordance with published UL configurations
  - G. Raceways shall be sized as shown and/or as required by the NEC. minimum size shall be 1/2"

## H. Raceway installation:

Outdoors (exposed): use rigid steel or IMC. (rigid steel where subject to physical damage). Outdoors (concealed): use rigid steel or IMC Boxes and enclosures (outdoors): NEMA 250, type 3r. Indoors (exposed): use EMT, rigid steel or IMC. (rigid steel where subject to physical damage). Boxes and enclosures (indoors): NEMA 250, type 1, except as follows: damp and wet locations: NEMA 250, type 4, stainless steel or non-metallic

16.8 Conductors

- A. Conductors W/R4 insulation shall be copper, minimum size #12. sizes #10 and #12 shall be solid, #8 and larger, stranded. Insulation shall be type THW, THWN or THHN for feeders, type THWN or THHN for branch circuits, and type use for directly buried conductors W/R4 insulation.
- B. Conductors shall be color coded throughout, sizes #10 and #12 shall be factory coded, sizes #8 and larger may be color taped on the job. Color coding shall be: phase a-black, phase b-red, phase c-blue, neutral-white, ground-green for 120/208 volt systems. Color coding shall be: phase a-brown, phase b-orange, phase c- yellow, neutral- gray, ground-green for 277/480 volt systems
  - C. Conductors shall meet the latest requirements of NEMA and IPCEA and shall be UL approved.
- noted otherwise. No splicing will be permitted in panelboard cabinets, safety switches, etc.

Direct buried raceways shall be 24" deep to the top of the raceway. Trench in compliance with local codes and regulations. Backfill to 95% compaction and re-sod grassed areas to match existing. 16.10 Marker Tape:

All underground conductors shall be identified by underground line marking tape located directly above t conductors at 6 to 8 inches below finished grade. Tape shall be permanent bright-colored, continuous foil backing least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder suitable for use with metal detection devices, for direct burial not less than 8 inches and 4 mils thick. Printed legend shall be indicative of type of underground line below.

### 16.11 Wiring Devices:

Provide heavy duty industrial specification grade brown switches. Match device color to existing installed devices. All devices shall be rated 20 amperes. Hubbell HLB 5362 and HLB 1221 or equal by Pass and Seymour or Leviton. Provide 302 stainless steel device plates.

## 16.12 Safety Switches:

NEMA KS 1, type HD with externally operable handle interlocked (defeatable) to prevent opening front quick make-quick break type. Handle lockable in on or off position. Switches shall have handles whose positions

Enclosed circuit breakers shall be molded case, UL listed and shall be rated as shown on the drawings with area. appropriate withstand ratings and current limiting characteristics as required to safely function and protect the 16.14 Circuit Breakers:

Circuit breakers indicated to be installed in existing panelboards shall be molded case, UL listed and shall be rated as shown on the drawings. Provide all necessary mounting hardware and accessories as required to shall be UL listed and field installable.

## 16.15 Identification Nameplates:

Furnish and install engraved laminated phenolic nameplates for all safety switches, panelboards and electrical equipment supplied for identification of equipment controlled, served, phase, voltage, etc. Nameplates proceeding with any phase of the work. B. Flexible metal conduit and liquid tight flexible metal conduit: UL approved and labeled with hex nut steel shall be securely attached to equipment with metal screws and shall identify by name the equipment control acceptable. Nameplate material colors shall be black surface with white core for the normal power system and red of this work. Such damages shall be repaired and/or replaced by the Contractor at no additional cost to the surface with white core for the emergency power system.

## 16.16 Other Materials and Equipment:

Other materials and equipment to be as shown on the drawings. Where no specific material type is mentioned, a high quality product of a reputable manufacturer may be used provided it conforms to the

### 16.17 Grounding:

All grounding shall be in accordance with article 250 of the NEC. In addition, the following requirements shall be met:

- A. Grounding conductors shall be installed as to permit the shortest and most direct path from equipment to ground. All ground connections to ground conductors W/R4 insulation shall be accessible.
  - B. Equipment ground continuity shall be maintained through flexible metal conduit.
- C. All wiring devices equipped with grounding connection shall be solidly grounded to ground system with grounding conductors.
- D. All circuits shall contain an insulated, green, copper grounding conductors, sized in accordance with table 250-122 of the NEC. Grounding conductors shall be connected to equipment ground bus in panelboard and securely attached and grounded to the device or enclosure at the other end.
- E. All equipment enclosures, and non-current metallic parts of electrical equipment, raceway systems, etc., shall be effectively and adequately bonded to ground.

16.18 Electrical Distribution System Tests:

- A. All current carrying phase conductors and neutrals shall be tested as installed and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500 volt megger.
- 1. Minimum readings shall be one million (1,000,000) or more ohms for #6 wire and smaller, 250,000 D. All conductors shall be continuous without splice between junction, outlet, device boxes, etc., unless ohms or more for #4 wire or larger between conductors W/R4 insulation and between conductors and the grounded metal raceway.
  - 2. After all fixtures, devices and equipment are installed and all connections completed to each panel, The Contractor shall disconnect the neutral feeder conductors from the neutral bar and take a megger reading between the neutral bar and grounded enclosure. If this reading is less than 250,000 ohms, the Contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the , panel and until the low reading ones are found. The contractor shall correct troubles, reconnect and retest until at
  - 3. The Contractor shall certify in writing the above has been done and tabulate the megger readings for each panel.
  - B. Test all systems modified or disturbed by this construction for proper operation and function in a manner approved by the system manufacturer. Provide written certification of all tests. 16.19 Existing Buildings And Construction:
- A. The Contractor is cautioned that work to be performed under this contract is to be accomplished in an existing occupied building. All such work shall be scheduled and arranged to be done at the convenience of the cover with switch in on position, enclosed load interrupter knife switch. Mechanisms shall be non-teasible, positive, Owner so as not to interfere with, disrupt, or disturb normal operations in the building. The Contractor shall obtain approval from the Owner before proceeding with work in existing buildings and shall work in existing buildings on
  - B. The Contractor shall, at all times, provide safety barriers, protective devices, screening, dust barriers, etc., as required to maintain the safety and comfort of the building's personnel and/or occupants in or near his work
- C. The Contractor shall be responsible for cleanup in connection with his work in existing buildings. All distribution system. Accessories shall be provided as noted or required and shall be UL listed and field installable. demolished equipment and materials shall become the property of the Contractor. At the end of each working day, debris, boxes, waste, etc., shall be removed from the buildings and properly disposed of. Contractor equipment, materials, etc., must be properly stored, stacked and located as instructed by the Owner.
- D. The Contractor shall do all cutting, patching, finishing, repairing, painting, etc., necessary for work to install new circuit breakers. New circuit breakers shall match existing types installed and be rated consistent with be installed in existing buildings. All finishes shall be left to equal finish and condition prior to cutting. No cutting of structural members will be allowed. Remove/replace existing lay-in ceiling as required to accomplish work. All cutting of walls, floors, roofs, etc., shall be repaired and/or replaced to equal finish prior to cutting. Core drill all holes for piping and conduit. The Contractor shall route pipe, conduits, duct work and locate equipment as approved by the Owner's representative. Routings and locations shall be firmly established and approved before
- E. The Contractor shall be responsible for any and all damage to the existing buildings, grounds, walkways, attached, etc. Letters shall be approximately 1/4-inch high minimum. Embossed, self-adhesive plastic tape is not paving, etc., caused by the work, The Contractor and/or his personnel, and/or his equipment in the accomplishment Owner, to finish equal to that finish prior to damage. The Owner's representative shall be the judge as to equal finishes, etc.
  - F. Coordinate power outages with the Owner. Request outages 24 hours in advance. 18.20 Submittals: Submittals shall include product data for all materials specified including each switchboard, panelboard, transformer, safety switch, lighting fixture, overcurrent protective device, fire alarm system, surface raceway, wireway, fitting, wiring device, accessory, and component indicated. Include dimensions and manufacturers technical data on features, performance, electrical characteristics, ratings and finishes. 16.21 Guarantee:

The Contractor shall guarantee the materials and workmanship covered by these drawings and specifications for a period of one year from the date of acceptance by the Owner. The Contractor shall repair and/or replace any parts of any system that may prove to be defective at no additional cost to the owner within the guarantee period.

SUT FINS 1.-804 **—** ഗ&~



- M С. 5 La ewletting $\leq N \leq$ SHEET TITLE

ELECTRICAL SPECIFICATIONS

DRAWN BY: APPROVED T.E.H. T.E.H. tardison \$ Clark Plans 5-4-2016 2.dw DATE: May 4, 2016

OWNER APPROVAL

Panelb	oard: "P-I" Front Ur	nt Panel								
Мои	unting: Flush Voltage: 208-120 Volt, 1 Phase, 3 Wire									
NEM	A I Rated	Mains	s: l	ML	М	ın. AIC Ratıng: 22 K	AIC			
Fram	e: 125 Amp.				Trip: N	/A			Phase I	Load KVA
CKT.	Description	Lc	oad	Trip	CKT.	Description	Load	Trip	Load	Load
1	Receptacles - Living A	rea I	1.4	15	2	Receptacles - Washer	1.4	20	2.8	
3	Receptacles - Kitchen	(L) I	1.4	15	4	Receptacles - Kitchen (R)	1.4	15		2.8
5	Receptacle - Dryer	2	2.0	30	6	Air Handler w/ Aux. Heaters	3.5	30	5.5	
7	]		<b>V</b>	30	8		₩	30		5.5
9	Range Hood	С	0.5	15	10	Kıtchen Lıghts	.05	15	1.0	
1.1	Heat Pump (Exterior)	ı	1.1	15	12	Living Area \$ Exterior Lights	0.1	15		1.2
13			♥ [	15	14	Bathroom Lights	0.1	15	1.2	
15	Receptacle - Bathroor	m I	1.4	20	16	Bedroom & Exterior Lights	0.2	15		1.6
17	Water Heater	3	3.0	30	18				3.0	
19	1		<b>\</b>	30	20					3.0
21					22					
23					24					

ſ		
	Total L1	13.5
	Total L2	14.1
	Total KVA	27.6

120 Amps Tota	al
@ 230 Volts,	

Panelb	oard: "P-2" Middle l	Jnit Pand	el								
Mour	ntıng: Flush	Volta	age	:: 208-120 Volt, 1 Phase , 3 Wire							
NEM	A I Rated	Maın	ıs:	ML	М	ın. AIC Ratıng: 22 K	AIC				
Fram	e: 125 Amp.				Trip: N	/A			Phase l	Load KVA	
CKT.	Description	La	oad	Trip	CKT.	Description	Load	Trip	Load	Load	
1	Receptacles - Living A	rea i	1.4	15	2	Receptacles - Washer	1.4	20	2.8		
3	Receptacles - Kitchen	(R)	1.4	15	4	Receptacies - Kitchen (L)	1.4	15		2.8	
5	Receptacle - Dryer	2	2.0	30	6	Air Handler w/ Aux. Heaters	3.5	30	5.5		
7			₩ [	30	8		₩	30		5.5	
9	Range Hood	(	0.5	15	10	Bedroom Receptacles	1.4	15	0.9		
1.1	Heat Pump (Exterior)	i	1.1	15	12	Living Area \$ Kitchen Lights	0.1	15		1.2	
13			\	15	14	Bedroom # Exterior Lights	0.2	15	1.3		
15	Receptacle - Bathroon	m i	1.4	20	16					1.4	
17	Bathroom Lights	(	0.1	15	18				0.1		
19	Water Heater	3	3.0	30	20				3.0		
21			▼ [	30	22					3.0	
23					24						

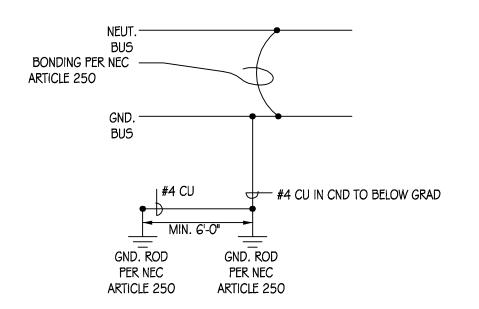
Γ		
	Total L1	13.6
	Total L2	13.9
	Total KVA	27.5
L	· ·	·

l 20 Amps Total @ 230 Volts, I Phase

N 1011	Mounting: Flush Voltage: 208-120 Volt, 1 Phase, 3 Wire									
וטטטו	ntıng: Flush	VOIL	lage	2; <u>~</u>	00-12	U VOIL, 1 1 11858, 5	VVIITE			
NEM	A I Rated	Maıı	ns:	ML	M	ın. AIC Ratıng: 22 K	AIC			
Fram	e: 125 Amp.				Trip: N	I/A			Phase l	Load KVA
CKT.	Description		Load	Trip	CKT.	Description	Load	Trip	Load	Load
1	Receptacles - Living A	Area	1.4	15	2	Receptacles - Washer	1.4	20	2.8	
3	Receptacles - Kıtchen	(R)	1.4	15	4	Receptacles - Kıtchen (L)	1.4	15		2.8
5	Receptacle - Dryer		2.0	30	6	Receptacles - Bathroom	1.4	30	3.4	
7			▼ [	30	8	Receptacles - Bedroom	1.4	30		3.4
9	Range Hood		0.5	15	10	Kitchen \$ Bathroom Lights	0.1	15	1.0	
1.1	Heat Pump Package U	nıt	1.9	15	12	Bedroom \$ Exterior Lights	0.1	15		2.0
13	(on Roof)		▼ [	15	14				1.9	
15	Water Heater		3.0	30	16				3.0	
17			<u> </u>	30	18					3.0
19					20					
21					22					
23					24					

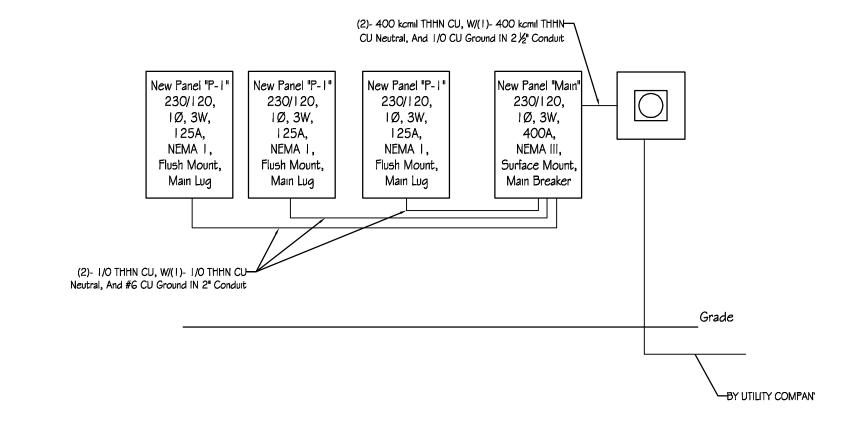
Total L1	12.1
Total L2	11.2
Total KVA	23.3

101 Amps Total @ 230 Volts, I Phase









3	Riser Diagram
E-1	Scale: NTS

Load Demand Calculation				
	Actual (KVA)	Factor	Calculated Load (KVA)	
Lighting	1.35	1.25	1.69	
Receptacle (First 10 KVA)	10.00	1.00	10.00	
Receptacle	6.80	0.50	3.40	
Sub Total			15.09	
Hot Water	9.00	1.00	9.00	
HT & CL Units (Largest of the Two)	9.20	1.00	9.20	
Total			33.29	

DISON & CLARK RESIDENTIAL HOTEL

SHEET TITLE

PANELS & ELECTRICAL DETAILS

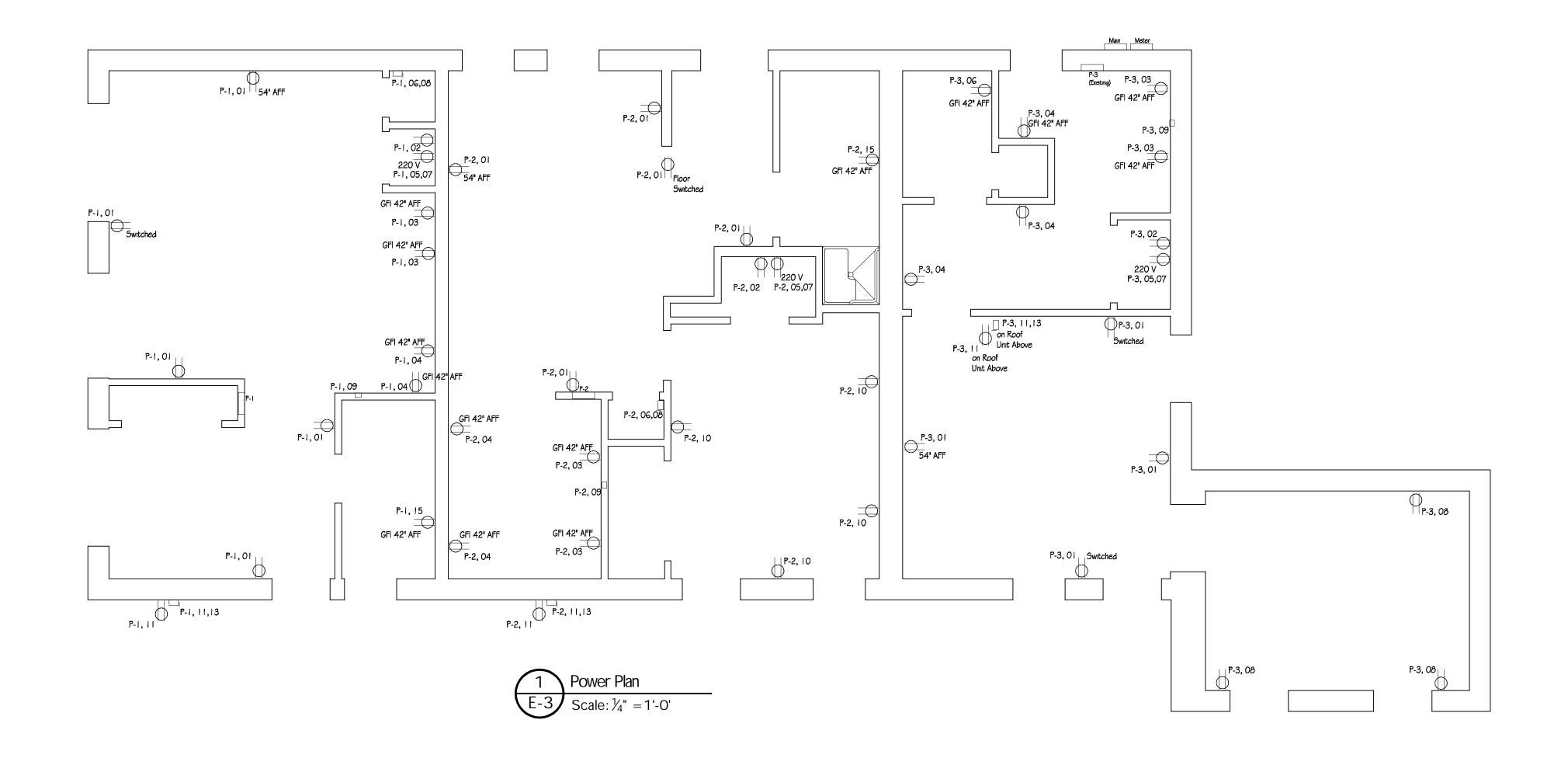
DRAWN BY: APPROVED T.E.H. T.E.H. Hardison & Clark Plans 5-4-2016 2.dwg

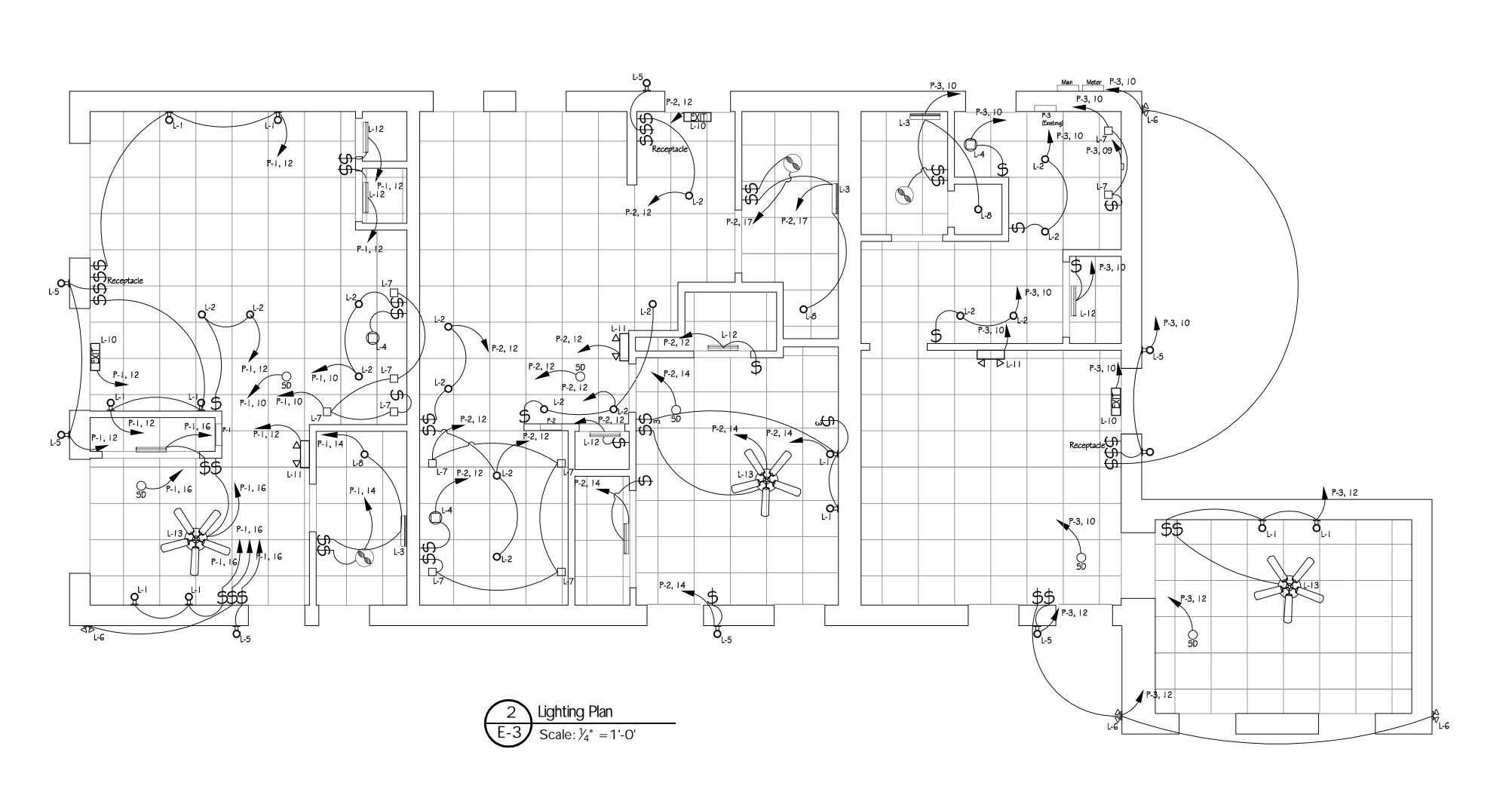
DATE: May 4, 2016

TF.

SHEEL E-2

	Description	Sıze	Manufacture	Model Number	Number Bulbs	Voltage	Fixture Watts
L-I	Interior Wall Sconce	8" X 8.5"	Aspect	USS60030LBNWS	1	120	10.5
L-2	4" LED Can Light	4" Diameter	EnviroLite	EV407941WH30-2	1	120	14.0
L-3	Vanity Light	21" X 8"	Kıchler	37388	3	120	21.0
L-4	Pendent Light	4.125 Ø	Olvero	93903A	2	120	7.0
L-5	Exterior Wall Sconce	7" X 7"	Essex	HB7054A-35	1	120	5.6
L-6	Exterior Two Head Flood	8" X 8"	Lithonia	OFLR 6LC 120 P BZ	2	120	20.0
L-7	Under Cabinet Light	3.75" Ø	Sea Gull Lighting	988595W-986	2	120	4.0
L-8	4" LED Can Light (MR)	4" Diameter	Globe Electric	90752	1	120	9.0
L-9	Fan/Light Combination	N/A	Nutone	XN50	1	120	40.0
L-10	Emergency Exit Sign	N/A	Lithonia	LE EL N SD	1	120	2.8
L-11	Two Head Emergency Light	N/A	Lithonia	ELM2 LED	2	120	1.4
L-12	Closet Light	24" Long	Lithonia	UC24E120M6	I	120	16.0
L-13	Fan/Light Combination	44" Ø	Hampton Bay	14412	1	120	180





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SHEET TITLE
POWER \$

LIGHTING
PLANS

DRAWN BY: APPROVED
T.E.H. T.E.H.

T.E.H. T.E.H.

Hardison & Clark Plans 5-4-2016 1.dw

DATE:

May 4, 2016

SHEET E-3 OF 12